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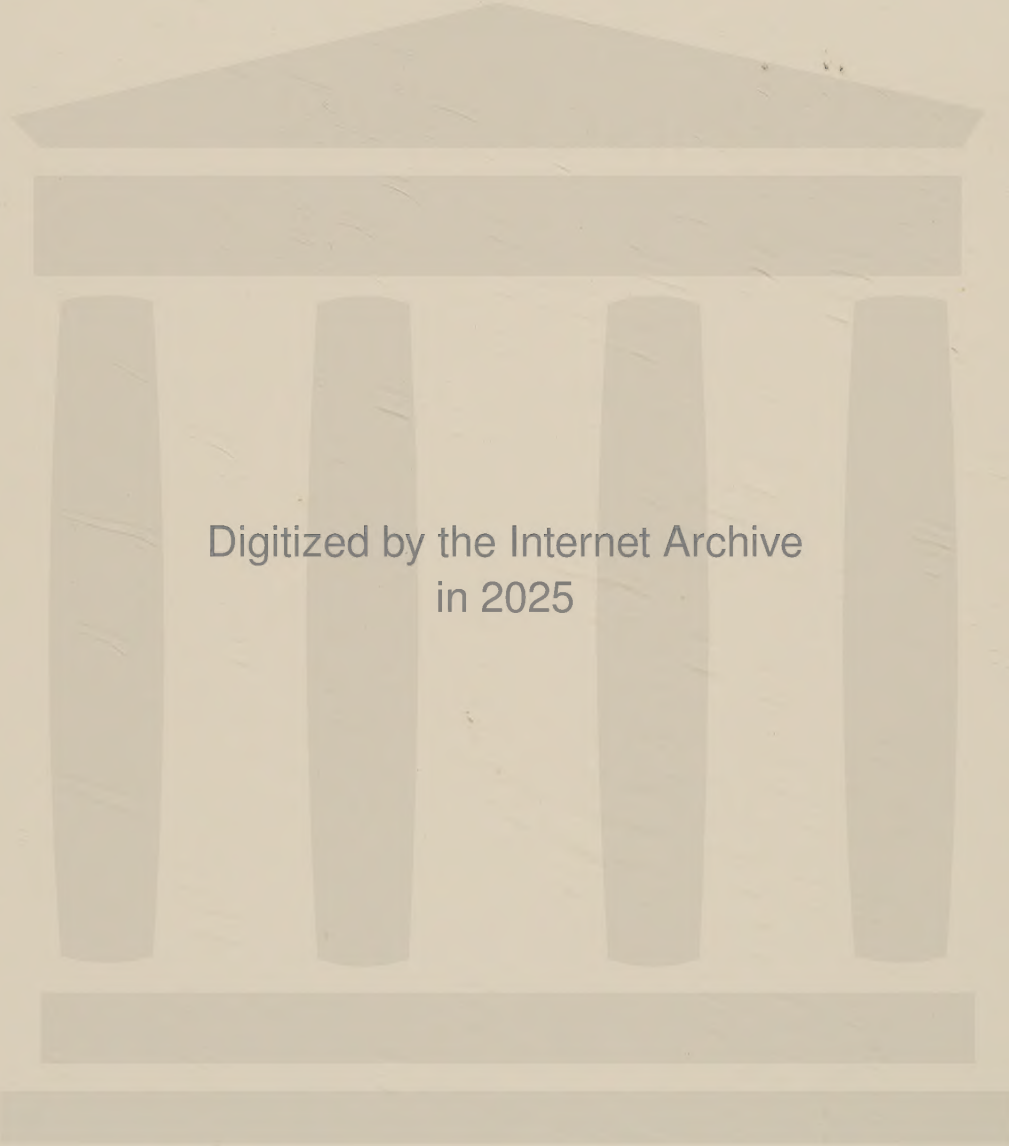
SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - NOVEMBER 1976

RESEARCH HIGHLIGHTS

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MONTHLY REPORT - NOVEMBER 1976

STATUS OF PUBLICATIONS

Published

Ahlstrom, Elbert H., H. Geoffrey Moser, and Michael J. O'Toole. 1976.
Development and distribution of larvae and early juveniles of the
commercial lanternfish, Lampanyctodes hectoris (Gunther), off the
west coast of southern Africa with a discussion of phylogenetic rela-
tionships of the genus. Bull. So. California Acad. Sci. 75: 138-152.

Lampanyctodes hectoris is a species of lanternfish which is
becoming an important part of the pelagic fishery off South Africa.
The Southwest Africa Pelagic Egg and Larval Survey has provided an
abundance of larval specimens of this species. The larvae, transi-
tional and early juvenile stages are described and illustrated for
the first time and information on their distribution and relative
abundance is provided. Larval characters are used in combination
with selected adult characters to elucidate the phylogenetic
affinities of this genus.

This issue honored Dr. Carl Hubbs, Professor-Emeritus of Biology
at Scripps Institution of Oceanography and one of the world's most
renowned ichthyologists.

This report does not constitute publication and is for information only.

Manning, Raymond B., and Paul Struhsaker. 1976. Occurrence of the Caribbean stomatopod, Bathysquilla microps, off Hawaii, with additional records for B. microps and B. crassispinosa. Proc. Biol. Soc. Wash. 89(38): 439-449.

Bathysquilla microps, previously known only from the tropical western Atlantic, is reported from the Hawaiian Islands on the basis of a single female collected in 1972 at a depth of 731-786 m north of Maui. The only major morphological difference noted between specimens from the two regions is the presence of armed intermediate carinae on the first abdominal somite in the Hawaiian specimen, whereas the intermediate carinae of the Atlantic specimens are unarmed. This single difference is considered insufficient to warrant recognition of a Hawaiian subspecies. Additional records of B. microps from the Gulf of Mexico and off Surinam and French Guiana are provided. New records of B. crassispinosa from Japan and Madagascar are reported: No differences between specimens from the two regions were noted. Comparative diagnoses and figures for the two species are given, as well as color notes on B. microps from photographs of fresh specimens from the Hawaiian Islands and the Atlantic. The distributions of four species or species groups of slope fishes which exhibit distributions similar to B. microps are also noted.

Neill, William H., Randolph K. C. Chang, and Andrew E. Dizon. 1976. Magnitude and ecological implications of thermal inertia in skipjack tuna, Katsuwonus pelamis (Linnaeus). Environ. Biol. Fish. 1(1): 61-80.

Heat exchange experiments with sedated and free-swimming skipjack tuna, Katsuwonus pelamis (Linnaeus), yielded the following results: For fish between 0.4 and 3.5 kg in weight (W):

1) inertial resistance to cooling and warming were virtually equal over the same span of temperature (10° to 30° C);

2) thermal inertia of red muscle, white muscle, and brain (in intact, living animals) was proportional to $W^{0.45}$ (i.e., coefficient of temperature change, $k, \propto W^{0.45}$ for each tissue);

3) white muscle, brain, and ventricular blood equilibrated with a changed environmental temperature about 1.1, 3.3, and 20 times as rapidly as red muscle;

4) the countercurrent heat exchanger was about 95% efficient as a thermal barrier between gills and red muscle; consequently, only about half (30%-80%, depending on W) the total heat transfer between the red muscle and the environment occurred across the gills;

5) under conditions of thermal equilibrium, the red muscle and white muscle of sedated fish were warmer than the environment by amounts independent of environmental temperature but proportional to $W^{0.58}$ and $W^{0.61}$, respectively; in contrast, the excess temperature of the brain was independent of fish weight but bore a weak, positive relation to environmental temperature; and,

6) in two free-swimming fish stimulated to violent activity by chasing, the red muscle warmed at rates up to $0.3^{\circ}\text{C min}^{-1}$, ultimately attaining temperatures 1.5° and 3.4°C above pre-chasing equilibrium levels.

Approved by Center Director

Sharp, Gary D. and William J. Vlymen III. "The relation between heat generation, conservation and the swimming energetics of tunas." For publication in *Environmental Biology of Fishes*.

McClure, V.E., E. D. Scura, G. H. Theilacker and G. W. Rommell. "Exchange of PCB between air and sea water and its dependence upon colloid association." For publication in *Geochimica et Cosmochimica Acta*.

Dizon, Andrew E. "The effect of dissolved oxygen concentration and salinity on swim speed in two species of tunas." For publication in the Fishery Bulletin, U.S. (Note).

HONOLULU LABORATORY

RESOURCE ASSESSMENT AND DEVELOPMENT INVESTIGATIONS

Work Continues on Prospectus for Northwestern
Hawaiian Islands Study

Dr. Robert Skillman, Coordinator of the Northwestern Hawaiian Islands (NWHI) study at the Honolulu Laboratory spent most of the month on various aspects of finalizing the prospectus "Survey and assessment of the living resources of the Northwestern Hawaiian Islands, a tripartite cooperative agreement." A new draft of the main body of the agreement and all but one of the appendices dealing with the activities of the three potential signatories have been completed. The appendix on the schedule of implementation has yet to be completed. Other likely appendices include research by other agencies on the Hawaiian monk seal, the green sea turtle, sharks, and precious coral. Also discussed were the contents of Appendix B, "Legal restraints and other restrictions," particularly section 8, "Specific restrictions on access and activities" (all of the latter written by the U.S. Fish and Wildlife Service), with representatives of the State of Hawaii, Division of Fish and Game and the Refuge Manager, U.S. Fish and Wildlife Service.

Plans Updated for Field Work in NWHI

At the request of Laboratory Director, Mr. Shomura, Dr. Robert Skillman provided input on the chartering of a commercial vessel for resource surveys on demersal and pelagic fish resources in the NWHI during the winter quarter when the Townsend Cromwell will be in the eastern tropical Pacific carrying out porpoise surveys. This charter will be executed concurrently with a charter by the Marine Mammals Division, Northwest Fisheries Center, to survey Hawaiian monk seal populations in the NWHI.

Because the surveys to the NWHI will constitute the major part of the cruise schedule of the Townsend Cromwell, Dr. Skillman, as coordinator of the NWHI study, has assumed the responsibility of general scheduling and planning for the ship. Due to loss of sea time and other demands on ship time, some rescheduling of cruises became necessary. A new cruise schedule for FY 1977 and FY 1978, along with tentative personnel assignments was issued.

Theoretical Studies on Tag Shedding Rates Continued

Dr. Jerry Wetherall, Fishery Biologist, and Marian Yong, Mathematician, at the Honolulu Laboratory continued work on a theoretical study of maximum likelihood methodology for estimating tag shedding rates from double tagging experiments. Dr. Wetherall and Ms. Yong are revising and rewriting a manuscript on the subject, and elaborating on some earlier results.

Dr. Wetherall is also working jointly with Dr. Michael Laurs of the La Jolla Laboratory on an analysis of North Pacific albacore growth. A covariance analysis is being performed to test various hypotheses about growth rates. Estimates of growth rate are based on tagged albacore released in various locations on the U.S. west coast during 1971-1976 and recovered in the United States and Japanese albacore fisheries.

Fishery Management Research Task Being Organized

A Fishery Management Research Task headed by Acting Leader Jerry Wetherall, is being organized to develop management policy analyses and assessments for fisheries in the central and western Pacific. The task will increase NMFS capability in fulfilling its obligations under the Fishery Conservation and Management Act of 1976. Dr. Wetherall has drafted a Task Development Plan and job descriptions for key positions in the task, such as the position of Resource Economist.

Already assigned to the task are Howard Yoshida, Fishery Biologist, and Roy Mendelssohn, Operations Research Analyst. During November, Mr. Mendelssohn completed his Ph.D. dissertation on "Optimal Harvest strategies for stochastic populations," and drafted a manuscript, "Harvesting with smoothing costs," which extends results of the Ph.D. thesis and describes

the characteristics of optimal harvesting policy when the objective function considers not only the net benefits in each harvest period but also costs introduced by period-to-period variation in the catch.

During a trip to California in mid-November, Mr. Mendelssohn participated in a CalCOFI workshop where scientists discussed various problems connected with modeling and management of the northern anchovy fishery.

Capture of a Shark New to Science Reported

Dr. Leighton Taylor, Director of the Waikiki Aquarium and Dr. Paul Struhsaker, Fishery Biologist, reported the capture of a shark representing an undescribed species, genus, and family. The shark was caught on November 15, by accident off Kaneohe, Oahu at a depth between 152.4 and 304.8 m (500 and 1,000 ft) when it became entangled in the parachute sea anchor of a Navy research vessel. The shark, a mature male, measured 445 cm (14.6 ft) in total length and weighed 691.7 kg (1,525 lb). Although it has a large mouth, the shark has small, needlelike teeth arranged in rows. A preliminary examination of the stomach contents showed that the shark had fed on organisms containing a high level of carotenoids, suggesting species of mesopelagic crustacea. Dr. Taylor and Dr. Struhsaker plan to publish a description of this new species of shark. The shark will be placed in the collection of the California Academy of Science at a later date.

NOAA Research Vessel Townsend Cromwell Returns from Experimental Fishing Cruise in Northwestern Hawaiian Islands

Mr. Richard Uchida, Acting Leader, Insular Fishery Resources Task, reported the return of the NOAA research vessel, Townsend Cromwell, on November 24 from a fishery resource assessment cruise to the northwestern Hawaiian Islands.

On board the Cromwell were Fishery Biologists Thomas Hida and Reginald Gooding and Research Assistant Paul Shiota, James Uchiyama, and Victor Honda. Mr. Hida, Chief Scientist on the cruise, reported that experimental bottom trawling, fish and lobster trapping, and handlining, were conducted. Members of the field party tagged 596 spiny lobsters during the cruise. Mr. Hida reported that the California two-chambered lobster pot outfished the conventional Hawaiian lobster traps by about 2:1.

Several hundred pounds of "red tail" opelu were caught at depths of about 200 fathoms off Necker and Laysan Islands. Until last year this species of scad was not recorded from the Hawaiian Archipelago. Mr. Hida also noted that the trawl catches, although not spectacular, were relatively good.

Included in the cruise was a survey of Hancock Seamount, a pinnacle rising 1,600 fm from the floor of the ocean just 200 miles northwest of Midway Island. Foreign fishing vessels have been reported to harvest thousands of tons of pelagic armorhead there.

This cruise of the Cromwell is one of the first in a 5-year intensive survey and assessment of the inshore and inner slope resources of the little known area to the north and west of the main Hawaiian Islands. Cooperating in the undertaking are NMFS, the U.S. Fish and Wildlife Service, and the Department of Land and Natural Resources of the State of Hawaii.

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Mr. Tamio Otsu, Chief, RADI, completed a rough translation of an article on the pelagic armorhead by Tokashi Sasaki of the Far Seas Fisheries Research Laboratory. The article was translated for staff information.

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Fishery Biologist Walter Matsumoto completed the Narrative Report for Townsend Cromwell cruise 76-05-72 to the western Pacific. Mr. Matsumoto also reviewed and revised the skipjack tuna species synopsis manuscript, "Synopsis of biological data on skipjack tuna, Katsuwonus pelamis Linnaeus," by Matsumoto and Skillman.

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Dr. Skillman, HL Seminar chairman, prepared a list of suggested topics for a seminar by Dr. John Gulland, who will be passing through Honolulu after the conclusion of the skipjack tuna workshop in Noumea, New Caledonia.

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Mr. Uchida negotiated a property loan agreement for 20 California two-chambered lobster pots with Captain Skip Naftel of the F/V Easy Rider. In return for the loan of the gear Captain Naftel agreed to take along an HL observer on the Easy Rider's fishing trip to Necker Island. Mr. Donald Aasted, Fishery Methods and Equipment Specialist, went along as observer and collected data on spiny lobster catch rates and also tagged all undersized spiny lobsters.

Mr. Uchida also worked with Mrs. Lucille Tsukano and Mrs. Sally Kuba in establishing a data base for the Insular Fishery Resources task. The data punched on IBM cards by the Hawaii Division of Fish and Game do not include vessel codes for the handline and troll fisheries for the period from July 1972 to December 1975. Mrs. Tsukano has been trying to match the original catch reports with the IBM cards so that the catches could be identified by vessel. Mrs. Kuba wrote computer programs for printouts of various environmental and fish catch summaries in the NWHI.

Estimated Cumulative Hawaii Catch of Skipjack Tuna
Still Below Long-Term Average

The October 25-November 21 Hawaii landings of skipjack tuna were estimated at 255.6 MT (metric tons), which is 197.4 MT above the 1975 landings for the same period and 77.3 MT above the 1948-1975 long-term average. The cumulative landings from January through November 24 were estimated at 3,585.1 MT, which is 1,349.1 MT above last year's landings for the same period but still 587.0 MT below the average cumulative landings for the same period in 1948-1975.

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Pulou Niutoa, employee of the Government of American Samoa, recorded the lengths of 1,826 albacore from 38 vessels during the period from September 18 to November 12. He also collected 40 sets of catch and effort data. Acting Data Manager Ray Sumida, utilizing data from five vessels, calculated an average size of 90.2 cm and a catch rate of 2.34 albacore per 100 hooks.

FISH-ENVIRONMENT INVESTIGATIONS

Analysis of Data on Body Temperature and
Activity of 10 Tuna Almost Complete

Dr. Andrew Dizon, Leader, Experimental Ecology of Tunas Task at the Honolulu laboratory, reported that analysis of data from the 10 fish monitored for body temperature and swimming activity under controlled temperature conditions is almost complete. A computer program has been written to plot in a time series of the 4,000+ data points representing 10-min. averages of swim speed, body temperature, and water temperature. The program also determines and plots calculated body temperature. These calculations are made with water temperature and activity as independent variables for one of two models. The first is a fairly simple empirical model based on estimates of specific tissue metabolic rate (heat produced) and measured rates of heat loss from a single point within the animal (heat lost). The second is a much more complex and soundly grounded model using mathematical determinations of energy output (heat produced) and Fourier's law of heat conduction elaborated for a cylinder. The latter model was formulated by Drs. Gary D. Sharp (Inter-American Tropical Tuna Commission) and William J. Vlymen (NMFS, La Jolla).

Results of application of both models as well as other observations on the data will be reported in our upcoming conference on tuna behavior and physiology.

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The yellowfin tuna chemosensory project which was scheduled to terminate at the end of October has been extended to complete some final experiments. Research Assistant Walter Ikehara will be funded until the end of December for this project.

Preliminary analyses of tests with extracts of nehu completely free of amino compounds seem to indicate that amino acids and amines may indeed be the prime constituents of the stimulatory fraction and not long chain lipids and mucopolysaccharides as thought previously.

Currently, nitrogen concentrations of the various test extracts are being measured. Nitrogen concentrations will provide a rough method of quantifying the many different types of stimulants used in the study. Nose-plugging experiments are also being initiated to determine if the fish is using either the olfactory or gustatory modality.

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During the last month, preparations were made for a "bring-em-back-alive" cruise on the R/V Townsend Cromwell. Future work requires somewhat more electivity in fish species and size; because of this, relying on the local commercial boats for experimental fish becomes increasingly inefficient. This upcoming cruise is to determine if the Cromwell can be an effective fishing platform for bringing back live fish. If so, future research plans will be tailored accordingly.

A report detailing UH Graduate Student Mr. Richard Brill's research efforts over the past year has been written and a manuscript investigating the effects of low oxygen and salinity on activity in skipjack and yellow-fin tuna by Dr. Dizon has been approved by the Center and submitted to Fishery Bulletin.

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Mr. Heeny Yuen, Leader of the Recreational Fisheries Task, assisted Research Associates in initiating the Kona recreational fishery survey. Research Associates has a contract with HL on a "Study of bio-economics and optimal management criteria for utilization of Pacific billfish." Mr. Yuen also summarized data on recreational fisheries in Hawaii for Mr. Charles Yamamoto, Marine Fisheries Advisory Committee (MAFAC) member from Hawaii, completed the Narrative Report of Townsend Cromwell Cruise 76-04-71, and worked on a manuscript on the night handline fishery for tunas (ikasibi) off Hilo.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Report of Joint NMFS-AFRF Albacore Studies Conducted
During 1976 Completed

Dr. Michael Laurs, Leader of the Albacore Investigations group at the La Jolla Laboratory, reported that the staff has completed a 51-page report titled, "Report of Joint National Marine Fisheries Service (NMFS)/ American Fishermen's Research Foundation (AFRF) Albacore Studies Conducted During 1976." The report deals with four principal topics: 1) cooperative NMFS/AFRF early-season offshore studies; 2) food habits of albacore caught in offshore waters during 1976; 3) albacore scouting and research activities; and 4) joint NMFS/AFRF albacore tagging study. The following is an abstract of the findings of the first three topics. The results of the albacore tagging study will be covered in detail in the December Monthly Report:

Early-Season Offshore Survey

Catches made by AFRF charter vessels during the early-season offshore survey were only moderate. Overall, the catch record for 1976 is poor in relation to the catch per boat in June 1972, 1973 and 1974. The basic difference occurred in the day-to-day changes in the catches. A single day of good catch was generally followed by a day of poor or no catch, and no centers of persistent catch occurred as in 1972 and 1973. In 1974, there were also no large persistent centers of catch, but much larger catches were made and good catches were maintained as the vessels moved shoreward daily, apparently following the albacore movement.

The best catches of the charter vessels were centered in two locations: one near 31°30'N and a second near 33°30'N, both along 139°W. The southernmost of these was immediately south of the Subtropic Front and occurred in the second week of June. The second center of catch and many of the additional single days of modest catch were taken within the Transition Zone (TZ) waters. These findings match those from the earlier surveys in 1972, 1973 and 1974. In 1973, the earliest catches of consequence were south of, and very close to, the Subtropic Front. In all these earlier years, the major catches were taken within the Transition Zone in June. During June 1976 the Transition Zone was found to be narrow and the fronts well developed.

Most of the Jordan's fishing effort was expended in the TZ and in the vicinity of the Subtropic Front. Out of 11 fishing periods in the TZ, modest catches were made on two and small catches were made on five. Effort north and south of the Transition Zone produced negligible or no catches.

Food Habits of Albacore

The stomach contents of 56 albacore caught on jigs by the R/V David Starr Jordan between 30-36°N, 130-140°W during the 1976 NMFS-AFRF off-shore cooperative study were examined to investigate the feeding habits of albacore tuna in the offshore region. The fish ranged in size from 46 to 76 cm with 58-76 cm fish predominating.

Food was present in 49 of the 56 stomachs examined. The amount of food ranged from 0 to 48.0 ml, with an average of 6.5 ml per stomach and a median of 3.5 ml. In 1973 and 1974 the average amounts were 16.3 and 13.3 ml per stomach, respectively.

Crustaceans (amphipods, krill and other crustaceans) formed the dominant food item in the diet of albacore in the offshore area during the early-season period in 1976. This result is different from 1974 when analysis of food organisms indicated that squid was the dominant food item, and in 1973 when fish and amphipod crustaceans were most important.

Albacore Scouting, 1976 Season

The scouting activities of the charter vessels during the 1976 season produced several significant findings. There were a number of times when the charter vessels located fish in areas away from where fleets of boats were operating and directed them to fish. Good examples of this occurred in the vicinity of Guadalupe Island, off the Columbia River, near the Mendocino Ridge, off Crescent City, and off Morro Bay.

The charter boats also found no commercial concentrations of albacore in several large areas, even after considerable search. These findings, communicated to the fleet, were an important contribution in that it saved search time and effort. Scouting was unproductive in many areas off the Pacific Northwest, in the area outside of Guadalupe Island to the San Juan Seamount, and in a number of regions beyond about 200 miles off the coast.

STOCK AND RECRUITMENT PROGRAM

Study Begun on Effect of Ultra Violet Radiation on Eggs and Larvae of the Northern Anchovy, Pacific Mackerel, and Other Fishes

Fishery Biologist Dr. John Hunter, assisted by Dr. John Taylor, Research Psychologist at the La Jolla Laboratory, have begun a 2-year study under contract to the Environmental Protection Agency (EPA) to determine the effect of various levels of artificial and natural ultra-violet radiation on the eggs and larvae of the northern anchovy. EPA is

concerned with the diminution of the earth's ozone layer due to high flying jet aircraft and the subsequent increase in ultra-violet radiation. Data are needed for any regulatory decision regarding acceptable levels of ultra-violet radiation for marine organisms.

According to Dr. Hunter the La Jolla researchers hope to specify the levels of direct natural ultra-violet radiation that produce harmful chronic effects and lethal effects in at least two species of commercially important marine fish during the period of their life in which they would be the most sensitive to radiation effects because of lack of scales, pigment and activity, and the fact that the very sensitive processes of organogenesis are taking place. In the egg and larval stage, both species exist near the sea surface and consequently would be exposed to the highest levels of radiation in the marine environment. Variables to be studied by Drs. Hunter and Taylor include survival, growth, feeding capability, pigmentation, organogenesis, morphogenesis, and the general pathology of ultra-violet exposure.

ECOLOGY OF THE CALIFORNIA CURRENT

Pacific Hake Larval Index Updated

Fishery Biologist Gary Stauffer of the La Jolla Laboratory began preparation this month of an administrative report to update the Pacific hake larval index. This includes the 1975 CalCOFI survey and the 1976 hake Soviet survey by R/V Poseydon. The purpose of this report is to compare the larva index from these two surveys with the CalCOFI time series for presentation at the upcoming Soviet bilateral meetings tentatively scheduled for mid-January in Seattle. At present, there is no adequate method of extrapolating spawning biomass from a single cruise such as the Poseydon survey. On the other hand, a breakout of the historical CalCOFI larva data for the months of January and February omitting stations south of CalCOFI line 137 does provide a comparative time series for two indices, mean number of larvae per 10 square meters of surface area and percent of positive stations (those containing hake larvae). The values for the first index suggest that the spawning biomass in 1975 was relatively the same as that in 1955-1957 and 1966-1968. The mean number of larvae for the single Poseydon cruise in 1976 is 25% of 1975 value and similar to that for most of the previous years. The decline in percent of positive stations from 52.2% in 1966 to 36.2% in 1975 and 15.8% in 1976 suggests a reduction in spawning area since the start of commercial fishing in 1966 by the Soviets, although caution is indicated based on the scanty evidence provided by the limited Poseydon survey.

Morphological Condition of Anchovy Larvae Compared in Good and Poor Survival Years

Dr. David Arthur, National Research Council/NOAA Research Associate for 1976-1977 at the Southwest Fisheries Center, is continuing research on the difference in morphological condition between anchovy larvae caught

in a very good year (1963) and a poor year (1965) for survival. Morphological condition, measured by the relationship of body depth to length, has been shown to reflect the nutritional condition of larvae.

In the poor year for survival (1965) the condition of larvae was good in samples taken very close to shore in the southern California bight. Condition of larvae from inshore stations was poorer in samples from north of Point Conception and in northern Baja California. Condition of larvae in offshore samples was much poorer than that of the inshore caught larvae, except north of Point Conception where this situation appears to be reversed.

In 1963, the condition of larvae from most inshore stations was not quite as good as that of the poor year, but the condition of larvae from offshore stations averaged significantly better than in 1965. Onshore samples in 1963 averaged slightly better than offshore, however, the sample containing larvae in the best condition was at station 87.70, approximately 200 km from shore.

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Major emphasis was placed on cutting down the backlog of unidentified CalCOFI samples, and all persons in the Marine Environmental Assessment program have been spending at least one-half of their time identifying fish larvae from samples taken on CalCOFI cruises from 1972 and 1975, according to Dr. Elbert Ahlstrom, Leader of the program.

Work also continued on a number of other projects. Fishery Biologist Geoff Moser obtained larvae of the rockfish, Sebastes rubrivinctus, from a trawl-caught female and cultured these to the point of yolk exhaustion. The larvae obtained from this experiment permitted the identification of a complete series of this species.

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Fishery Biologist John Butler has completed a manuscript on Desmodema with Dr. Richard Rosenblatt of the Scripps Institution of Oceanography, which describes a new species. This manuscript has been submitted for publication to the Fishery Bulletin, U.S.

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Ms. Barbara Sumida, Fishery Biologist, continued her studies of life history series of flatfishes of the genus Pleuronichthys, working particularly on a series of P. coenosus during November.

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Dr. Paul Smith attended a meeting with representatives of the recreational fishing industry and the California Department of Fish and Game on November 24. The chief topic was the validity of the assumptions underlying the larval anchovy census.

On November 29, Dr. Smith was present at a meeting with California Department of Fish and Game personnel at which the presentation of the Department's anchovy plan to the California Fish and Game Commission was discussed.

Staff of Coastal Fisheries Resources Division Well
Represented at Annual CalCOFI Conference

The annual CalCOFI Conference was held at Indian Wells, California, November 16 to 18. Attending and presenting papers at this conference were the following members of the staff of the Coastal Fisheries Resources Division:

Alec MacCall: "Population estimates for the waning years of the Pacific sardine fishery." (Mr. MacCall is a biologist with the California Department of Fish and Game who is presently stationed at the Southwest Fisheries Center.)

Mrs. E. Stevens and Dr. Elbert Ahlstrom: "Further studies on neuston (surface) hauls on extended CalCOFI Cruise 7210."

Dr. J. Hunter and Mrs. Carol Sanchez: "Some aspects of the early life history of Pacific mackerel larvae, Scomber japonicus."

Mrs. Gail Theilacker: "Effect of starvation on histological and morphological characteristics of jack mackerel, Trachurus symmetricus, larvae."

Mr. Roger Hewitt, NOAA Corps, and Dr. Paul Smith: "Seasonal distributions of epipelagic fish schools over portions of the California Current region."

Mr. John Graves: "Allocation of free vehicle camera drops during acoustic surveys."

Mr. David Kramer: "The comparison of age and growth of anchovy larvae collected at sea with those reared in the laboratory."

Dr. Charles O'Connell: "Histological criteria for diagnosing the starving condition in anchovy larvae."

Dr. Paul Smith: "Mortality rates of embryos and larvae of the central subpopulation of northern anchovy 1951-1969."

Mr. Barrett, Acting Center Director, accompanied by Mr. David Mackett, Planning Officer, and Dr. Gary Stauffer, attended the meeting of the Pacific Regional Fishery Management Council in San Francisco on November 22-23.

At the meeting the city of Portland was selected as the headquarters site of the Council and the position of the Executive Director re-opened for selection at the December meeting.

As noted elsewhere in this report, Mr. Barrett has been named to serve on the Scientific and Statistical Committee of the Pacific Regional Fishery Management Council.

Dr. Stauffer answered questions on jack mackerel put to him by the Scientific and Statistical Committee who were concerned about the estimate of maximum sustainable yield and the suggested total allowable catch of 55,000 tons. Dr. Stauffer reviewed the biology of the jack mackerel populations, discussing what is known and what is questionable, leading into the conservative estimate of 55,000 tons.

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Both Drs. Dan Huppert of La Jolla and Roy Mendelssohn of Honolulu traveled to Indian Wells, California, following the regular CalCOFI meeting, November 18-19, 1976, where the Instituto Nacional de Pesca/CalCOFI Stock Assessment Committee created a Modeling Subcommittee to produce a detailed systems description of the northern anchovy stock.

During the week of November 28 to December 3, Dr. Huppert traveled to Eureka, California where he met Messrs. Earl R. Combs and George Fulton, both from Seattle. All three then traveled down the coast to San Pedro, stopping at Menlo Park, Monterey, Morro Bay, Santa Barbara and Oxnard. The purpose of the trip was to collect additional data relevant to the anchovy/jack mackerel contract let by the SWFC, and to assure that fishermen and others on the coast have had an opportunity to contribute comments and observations to the study.

Oceanic Fisheries Resources Division

PORPOISE/TUNA PROGRAM

Behavior Portion of Chartered Porpoise/Tuna Cruise Completed

The NOAA research vessel, David Starr Jordan, returned to San Diego on November 19 after completion of the behavior portion of a behavior/gear research cruise to observe porpoise/tuna interaction. The tuna seiner, Elizabeth C.J., is under charter to NMFS for a joint effort by

the Southwest Fisheries Center (SWFC), Naval Undersea Center (NUC), University of California, Santa Cruz (UCSC), and San Diego State University (SDSU), under the sponsorship of NMFS, the Marine Mammal Commission, (MMC), National Science Foundation (RAND), and the Porpoise Rescue Foundation (PRF).

The purpose of the behavioral portion of the cruise, during which the Jordan and Elizabeth C.J. operated in tandem in the vicinity of Clipperton Islands was to observe and document the behavior, including sound production, of porpoise and tuna before, during, and after the set, from the tunaboat, from a helicopter, and under water. The scientific party aboard the Elizabeth C.J. included Dr. K.S. Norris and Dr. W. Stuntz, University of California, Santa Cruz and Dr. W. F. Perrin and J. M. Coe of the Southwest Fisheries Center.

The initial group on the Jordan included D. B. Holts, SWFC; Dr. F. Aubrey, SDSU; S. Leatherwood and D. Ljungblad, NUC; Dr. E.D. Mitchell, observer from ENVIRONMENT Canada, Montreal; W. Rogers, UCSC; P. Vergne, Living Marine Resources, Inc.; and J. Thompson, Sr. and J. Thompson, Jr. of Seavision Productions.

After a first leg, during which 14 contracted net sets were made, the Jordan put into Manzanillo for refueling, carrying Norris and Perrin from the Elizabeth C.J.

Norris, Perrin, Aubrey, Leatherwood, Ljungblad and Mitchell left the cruise at this point and Dr. N. Lo of the SWFC and Ms. K. Pryor of the Porpoise Rescue Foundation joined it for the last leg. The Jordan rendezvoused with the Elizabeth C.J. and two more experimental sets were made, following which the Jordan returned to San Diego. The Elizabeth C.J. remains at sea with Coe and Vergne aboard.

In 30 sets on porpoise (some non-contracted sets were made), only 12 porpoise were killed. Only two of these deaths could definitely be ascribed to the fishing operation; some or all of the remainder were caused by experimental procedures. Approximately 700 tons of yellowfin tuna were caught in the 30 sets. The results of the behavioral observations are not yet available; dozens of note tapes must be transcribed, thousands of slides and thousands of feet of movie film must be processed, and many miles of acoustical tape recordings must be processed before actual analysis of the data can begin. In general terms, the shipboard and underwater observers collected a great deal of new behavioral information on school social structure, aggression, reaction to backdown, etc., that would appear, even at this initial stage, to have resulted in new insights into behavioral patterns and mechanisms. The acoustic monitoring was very successful, yielding first-time recordings of spotted and spinner porpoise in many situations as well as sound-level recordings of noise put out by the fishing operation itself. The aerial observations and photography were less successful but yielded usable data.

Data from the cruise are now being organized and processed, preparatory to analysis, by Dr. F. Aubrey (acoustic data) at San Diego State University and Dr. W. Stuntz, stationed at the SWFC.

Representatives of the Marine Mammal Commission, environmental groups, the tuna industry, and scientists from federal and state governments, colleges and universities, met at the National Marine Fisheries Service, Southwest Fisheries Center Laboratory in La Jolla, California, November 10 and 11. Their purpose was to assist in planning a SWFC-sponsored aerial ship survey of the porpoise populations involved in the yellowfin tuna purse seine fishery in the eastern tropical Pacific.

Coordinated by Dr. Eric Barham, Special Assistant for Marine Mammals at the Southwest Fisheries Center, the workshop resulted in a consensus on the external boundaries of the survey, on how the area within these boundaries might best be covered, and on the mathematical and statistical protocol for the survey. A surplus Navy Neptune (P2V-7), operated by the Office of Aircraft Services of the U.S. Department of the Interior, will be the primary surveying vehicle used to cover as much ocean area as feasible. The remaining areas will be covered by the NOAA research vessels, David Starr Jordan, out of San Diego and Townsend Cromwell, out of Honolulu, with Dr. David Au, of the SWFC, as Chief Scientist for the surface operations. Presently, six aerial observers and some standbys are undergoing a training program involving identification of porpoise species, estimates of school size, and methodology of the operation. The aerial operation is slated to begin from San Diego, California on or about January 17, 1977. The at-sea operations begin on January 4 with the departure of the Jordan from San Diego and the Cromwell from Honolulu on January 5.

TUNA RESOURCES PROGRAM

Summary of Research and Statistics Committee of ICCAT

Dr. Gary Sakagawa, Leader of the Tuna Resources Program at La Jolla and Mr. Al Coan, Mathematician on his staff, attended the 7th regular meeting of the Standing Committee on Research and Statistics (SCRS) (November 10-16) and the 4th regular meeting of the Council of the International Commission for the Conservation of Atlantic Tunas (November 16-22) at the Luz Palacio in Madrid, Spain. Dr. Sakagawa served as the U.S. spokesman in the SCRS meeting and was assisted by Mr. Coan and others. As spokesman, he also served on several working groups and assisted in preparation of all sections of the SCRS report. During the Council meeting he served as advisor to the U.S. Commissioners to ICCAT.

The following information on the findings and conclusions of the SCRS were taken directly from Dr. Sakagawa's trip report to the Acting Director, SWFC.

On yellowfin tuna: The 1975 catch was a record high of about 117,000 metric tons (MT) and the 1976 catch is expected to be even higher, 124,600 MT, despite a decrease in the total carrying capacity of the fleet owing to reduced participation by U.S. fishermen. Fishing effort, however, is expected to equal that of 1975.

Much of the increase in catch in 1975 and 1976 resulted from offshore expansion of the fishery into non-traditional fishing areas (off Sierra Leone and the Ivory Coast). French scientists indicated that fishing (seine only) in the offshore areas is conducted on floating objects, primarily. The fish caught are large, and the catch rates are high in the first quarter of the year.

The amount of undersized fish (less than 3.2 kg) in the surface catch captured much of the attention of the scientists, who estimated that it amounted to 37% in number of the total 1975 surface catch from the eastern Atlantic. The Committee also discussed the problem of identification of small yellowfin and bigeye tuna and the deliberate false reporting of catches of undersized yellowfin tuna as bigeye tuna. This problem has an impact on the SCRS' assessment of the condition of the stock as well as on the quality of the management advice.

On skipjack tuna: The 1975 catch of skipjack tuna was 60,000 MT, approximately half of the 1974 yield owing to poor availability of fish in the Angola and Annabon sectors. While the catch in 1976 is estimated to also be low, 40,000 to 50,000 MT, the cause is due to a shift of fishing effort onto yellowfin tuna rather than to low abundance or poor availability.

The Committee concluded that the current fishery is highly dependent on only one or two year-classes that fluctuate widely in availability; the growth rate of skipjack and apparent natural mortality rate are high and, therefore, a minimum size limit for skipjack will not increase the yield-per-recruit.

The Committee noted that the skipjack resource is considered large and available for development by many countries, yet not much is known about the exact potential yield. A 3-year intensive research program on skipjack tuna, which would culminate in an "International Skipjack Year" was proposed by the Committee to learn more about the resource.

On bigeye tuna: The bigeye tuna catch steadily increased since 1965, but in 1975 the increase appeared to have halted. The catch was 52,600 MT, about the same as in 1974. Because of the "mis-identification" problem with yellowfin, the Committee was hesitant to comment on the exact recent trends in bigeye tuna catches.

On albacore: The overall albacore catch has been decreasing since 1972 and the average age of fish in the catch has increased slightly. Cohort analyses indicated that recruitment in recent years has been on the decline.

Revised production model analyses indicated a maximum equilibrium yield of 45,000 to 55,000 MT for the northern stock and 30,000 MT for the southern stock. The Committee recommended that caution should be exercised in increasing effort on albacore stocks.

On bluefin tuna: The bluefin tuna catch has increased since 1972, amounting to 13,300 MT in 1975. The increase is due to better statistics from the Mediterranean as well as actual increased catches in the Atlantic. Increased catches in 1975 were recorded primarily by longliners (Japanese) and the harpoon-handline-trap fishery (U.S.) of the northwestern Atlantic. The Committee pointed out that: 1) the question of the stock structure of the bluefin tuna population is still unsettled, 2) substantial recruitment to the medium- and large-fish fisheries is not forthcoming until some years hence, and 3) yield-per-recruit would increase significantly if the average age at first capture was increased, but such a change would result in reallocation of catch among the fisheries.

The Committee reviewed the effects of the regulations and concluded that the proportion of undersized fish (below 6.4 kg) in the catch apparently declined in 1975.

On billfishes: No new information was presented on billfishes.

On small tunas: The Committee reviewed the report of the FAO Ad Hoc Committee of Specialists on Small Tunas and noted that Auxis (frigate mackerel) is probably the most abundant tuna resource in the Atlantic.



Participants in workshop to plan sampling procedures for aerial-ship survey of porpoise populations involved in the tuna purse seine fishery in the eastern tropical Pacific, held at the Southwest Fisheries Center, La Jolla, California, November 10-11, 1976. Shown left to right are:

Dr. David Anderson, College of Natural Resources, Utah State University
Dr. Lee Eberhardt, Battelle Northwest and the Marine Mammal Commission
Lt. Terry Jackson, NOAA Corps, Southwest Fisheries Center
Ms. Jackie Jennings, Southwest Fisheries Center
Dr. Robert Miller, NMFS, Washington, D.C.
Dr. Kenneth Burnham, U.S. Fish and Wildlife Service, Ft. Collins, Colorado
Mr. Terry Quinn, College of Fisheries, University of Washington
Dr. Al Erickson, College of Fisheries, University of Washington
Dr. Brad Crain, College of Natural Resources, Utah State University
Dr. Joseph Powers, Southwest Fisheries Center
Mr. Franklin Alverson, Porpoise Rescue Foundation
Mr. James Squire, Southwest Fisheries Center
Dr. Eric Barham, Southwest Fisheries Center

Also taking part in the workshop but not shown were:

Dr. Douglas Chapman, College of Fisheries, University of Washington
 Dr. William Fox, Southwest Fisheries Center
 Dr. William Evans, Hubbs Research Foundation, Sea World, San Diego
 Lt. Wayne Perryman, NOAA Corps, Southwest Fisheries Center
 Dr. Vince Gallucci, College of Fisheries, University of Washington
 Dr. David Au, Southwest Fisheries Center
 Dr. David Burdick, Porpoise Rescue Foundation and San Diego State University

Sampling of Foreign-Caught Atlantic
Tunas Continues in Puerto Rico

Biological Technician Eugene Holzapfel, stationed in Mayaguez, Puerto Rico, continued sampling foreign-caught Atlantic tunas for size and species composition for the La Jolla Laboratory.

Preliminary estimates of numbers of fish and tonnage sampled, by species and sampling quarter through December 7, 1976, are as follows:

	<u>Number of fish sampled</u>	<u>Weight sampled (metric tons)</u>		<u>Number of fish sampled</u>	<u>Weight sampled (metric tons)</u>
<u>Quarter I</u>			<u>Quarter II</u>		
Yellowfin	288	36.94	Yellowfin	765	311.48
Skipjack	151	240.32	Skipjack	450	1040.28
Bigeye	30	12.84	Bigeye	43	62.04
Albacore	--	--	Albacore	100	849.63
Other	--	--	Other	--	--
<u>Quarter III</u>					
Yellowfin	1506	275.32	Yellowfin	250	43.29
Skipjack	1265	10858.77	Skipjack	100	209.4
Bigeye (P)	23	5.50	Bigeye		
Albacore	150	1132.82	Albacore	50	70.96
Other	65	.997	Other	51	1.87

Preliminary length frequency analyses, performed by Mathematician Al Coan and Mathametics Technician Gene Gillerson, indicate that the majority of yellowfin and bigeye tuna catches are of small fish. Yellowfin tuna in the catches ranged from 32 to 136 cm with approximately 92% of the catch consisting of fish less than 55 cm long. Bigeye tuna ranged from 39 to 76 cm long with approximately 90% of the catch consisting of fish less than 55 cm. Skipjack tuna ranged from 33 to 65 cm long and albacore tuna ranged from 79 to 112 cm long.

As of December 7, 1976, 63 species composition samples have been collected from reported yellowfin or bigeye tuna landings. Preliminary results indicate that as much as 20% of the reported yellowfin tuna landings are bigeye tuna and as much as 95% of the reported bigeye tuna landings are yellowfin tuna.

Tuna Vessels Participate in Fisheries Service FAX Program

During November, 11 U.S. tropical tuna vessels participated in the FAX program of the La Jolla Laboratory:

	<u>Weather observations</u>	<u>XBT observations</u>	<u>Total</u>	<u>Total year to date</u>
1975	152	24	176	3,380
1976	123	2	125	2,578
Percent change	19.1	91.7	29.7	23.7

The tuna seiner, Santa Rosa, again led all cooperating vessels in September with 46 weather observations sent to the Southwest Fisheries Center via radio station WWD. The Santa Rosa's reports comprised 36.8% of the total number sent in; congratulations are due to Captains Noah and John Gomes of the Santa Rosa.

Year-End FAX Meeting Scheduled

Each year, personnel from the SWFC and the National Weather Service (NWS) meet with tropical tuna fishermen to discuss radio facsimile (FAX) charts and the flow of environmental data associated with the Cooperative Tropical Tuna Advisory Program. This year the meeting will be held on Tuesday, December 14, 1976 and will be sponsored by the SWFC. The meeting will be at Portuguese Hall in San Diego at 10:00 a.m. Talks to be presented at the meeting have been prepared by Leonard Snellman, NWS, Salt Lake City; Forrest Miller, IATTC, La Jolla, and Dick Evans, NMFS, La Jolla. In addition, Jim Steiner, NWS, San Diego; Emil Gunther, NWS, Redwood City; and Don Crouch of radio station WWD in La Jolla will be present to answer questions and take part in the group discussion. This meeting provides the captains and navigators of the 65 participating tuna purse seiners a chance to meet and talk with the individuals that prepare the FAX products that are broadcast from radio station WWD.

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Mr. Jim Renner, Fishery Biologist and Editor of Fishing Information, reports that the October issue of Fishing Information went to press on November 18. Two 15-day supplements of this publication were produced on the 15th and 30th of the month.

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Conversion of the monthly normal base charts for the north Pacific Ocean from Fahrenheit to Celsius was continued during the month and was about 75% completed. The charts are scheduled for use in future issues of Fishing Information when the publication converts to the metric system.

Documentation Completed for Use in Weekly and
Monthly Computer Runs of Marine Weather Data

Mr. Bruce Wahlen, Computer Programmer at La Jolla, has completed work on a set of decision tables to be used when making routine monthly and weekly computer runs of marine weather data. The tables, when used with the SWFC marine data deck, detail the programs and procedures to be used to derive a number of combinations of routine computer outputs.

When these tables are combined with the documentation for each program (Mr. Wahlen has completed a rough draft of the documentation for all of the computer programs to be utilized), a user will be able to execute the routine computer runs required.

PACIFIC ENVIRONMENTAL GROUP

OCEAN MODELING AND FORECASTING PROGRAM

WMO Sponsored Marine Meteorological
Observations Program

Mr. G. Seckel, Acting Chief of the Pacific Environmental Group, attended the World Meteorological Organization (WMO)-sponsored Technical Conference on the Applications of Marine Meteorology to the High Seas and Coastal Zone Development (TECMAR) held in Geneva, Switzerland, November 22-26. This conference preceded the seventh session of the Commission for Marine Meteorology (CMM). Summaries of the presentations and the recommendations of TECMAR become a part of the subsequent CMM deliberations.

WMO is the sponsor of the Worldwide Marine Surface Meteorological Observations Program and facilitates international cooperation and data exchange. Originally these observations were taken in order to provide a basis for climatological summaries. More recently the data being taken every 6 hours, have been used in synoptic weather forecasting.

At TECMAR applications ranging from marine forecasting and ship routing to storm surge warnings together with the activities supporting these applications were described. Mr. Seckel presented a paper on "Use of Marine Meteorological Observations in Fishery Research and Management." This is a new application and, along with the related application of marine meteorological observations in climate prediction, may become more important than some of the others that were described at the meeting.

Mr. Seckel introduced his talk with the following remarks:

"The meteorologist is used to draw on the observations regularly made at a large network of stations in order to monitor and to predict atmospheric changes. In contrast, the oceanographer has only a few stations where one or other oceanographic property are regularly observed. He can therefore not adequately monitor, let alone predict, ocean changes.

The situation is not entirely hopeless, however, because marine surface meteorological observations provide him with at least one ocean property, the sea surface temperature. Additionally, the wet and dry bulb air temperatures, the cloud cover, and the wind velocity can be used to estimate air-sea interaction processes. These processes, the heat exchange across the sea surface and the wind stress can be used, in turn, to infer changes in the ocean's troposphere.

Although, in time, satellites will provide some information and there may be a number of ocean buoys monitoring ocean properties, the mainstay of information will remain the marine surface meteorological observations.

An important mission of PEG is the development of indices from marine meteorological observations that can be used to infer and monitor ocean changes for fishery applications. It is therefore of interest to PEG and the NMFS that the WMO observations program is not only maintained but that the quality and distribution of observations be improved.

The marine observations program, of course, is a cooperative program and NMFS research vessels have always contributed to the synoptic weather observations. Additionally, PEG and the SWFC have been able to enlist the tropical tuna fleet in this worldwide synoptic observations program. These contributions are particularly useful because they usually come from areas outside shipping lanes where observations are sparse or even non-existent.

Thus, the NMFS has a stake in the WMO Technical Conference and the continued health of the marine observations program."

TIBURON LABORATORY

PHYSIOLOGY INVESTIGATION

Striped Bass Task

With the addition of two new employees in the Striped Bass Program, at the Tiburon Laboratory, processing of preserved samples from last spawning season's experiments is near completion. Measurements, weighings, and caloric content determinations were finished for all embryonic samples. An energy budget is now being prepared for the developmental period from fertilization to hatching. Preliminary results from experiments in which striped bass larvae were fed three different concentrations (0.1, 1 and 5 organisms/ml) of live food (Brachionus sp., Artemis salmi, and Daphnia sp.) show that larvae grew in direct, positive relation to the food concentration. In all treatments, complete yolk absorption coincided with the beginning of feeding, but the large oil globule persisted for 19 to 21 days. Larvae which were not fed adjusted their metabolism very early in development. In this way, they were able to conserve energy in the oil globule for up to 29 days, when they died. Even then, oil was present. Growth in starved larvae measured by standard length slightly decreased in the last 7 days before death. In contrast to starved fish, the fastest-growing fed larvae consumed their oil globule at a rapid rate. Larvae reared in isosmotic water also grew at a faster rate than larvae reared in fresh water.

Mickey Eldridge and staff completed a series of colored photomicrographs monitoring development of striped bass embryos and larvae. The micrographs document organ development in both preserved and live specimens, and provide a useful record of major developmental events.

OCSEAP Task

Work continued this month at the Tiburon Laboratory to develop an apparatus to saturate sea water with the water-soluble fraction of Cook Inlet crude oil; the final design was approved and preliminary testing was nearly completed. The first draft of a manuscript describing the apparatus was completed this month.

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Test aquaria were purchased this month and racks to hold the aquaria, solubilizing apparatus, and diluting systems were built. Modifications of the sea water system were continued, and an initial supply of little-neck clams (Tapes semidecussata) was collected by oil task personnel and volunteers. Arrangements were made to collect juvenile starry flounder in Tomales and Bodega Bays with members of the Pacific Marine Station at Dillon Beach, California.

Messrs. Tom Yocom and Pete Benville traveled to Seattle, November 10-21, to visit the Battelle Northwest Laboratory at Sequim, Washington; the Northwest Fisheries Center (NWFC), Seattle, Washington; the NWFC field station at Mukilteo, Washington; and the salmon and trout-rearing project at Manchester, Washington. They spoke with other oil researchers about experimental and analytical techniques. Among those visited were: Dr. Jack Anderson, Battelle Northwest; Dr. William McLeod, NWAFC; Dr. Donald Brown, NWFC, Mr. Herb Sanborn, NWAFC; Dr. Stanley D. Rice, Auke Bay Fisheries Laboratory; Mr. Sid Korn, Auke Bay Fisheries Laboratory; and Mr. John Karinen, Auke Bay Fisheries Laboratory.

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Mr. Yocom and Mr. Benville were joined in Seattle later in the week by Dr. Jeannette Whipple, and all attended the "Symposium on Fate and Effects of Petroleum Hydrocarbons in Marine Ecosystems and Organisms," sponsored by EPA and NOAA.

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Dr. Herbert Bruce, OCS Project Office, Juneau, Alaska, visited the laboratory this month and discussed task progress and problems with Dr. Whipple. A quarterly report to Dr. Bruce's office was prepared this month.

COASTAL FISHERIES INVESTIGATION

Local Fisheries Development

Mr. Susumu Kato, Chief, Coastal Fisheries Investigation at the Tiburon Laboratory, began making plans for a trial shipment of euphausiid shrimp to Japan. A frame trawl will be used by the vessel, Lady Olga, to catch euphausiids near Monterey Bay. The shrimp will be processed and packed by Consolidated Factors at Moss Landing. The frozen euphausiids will be shipped to Japan where the primary use will be as bait for sportfishing party boats. This trial should provide enough information on catch rate, processing costs and product acceptability to determine if a fishery for euphausiids is feasible.

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Detailed catch data from David Starr Jordan Cruise 76(07) 104 Leg 3B were compiled and mailed to all participants. Dover sole appears to offer the most promise for an expanded fishery in deeper waters. Individuals caught at Santa Lucia Bank (off Morro Bay) averaged over 17 in (45 cm) and 1.9 to 2.4 lb (0.9-1.0 kg). The average size acceptable to processors is considerably smaller.

Half of King Salmon Released in Storm

Mr. Roger Green, Leader of the Recreational Fisheries Improvement Task at the Tiburon Laboratory, reported that on November 27, gale-force winds and their storm waves broke loose one of the two salmon pens being used for king salmon rearing. The pen landed on a rocky shore south of the laboratory, but early detection enabled release of the fish and salvage of the pen before extensive damage was done. An estimated 2/3 of the 10,000 fish in this pen apparently were still in good condition when released. The 8,000 fish in the remaining pen are scheduled for release next month. Plans are to tag 5,000 of these.

Coho Salmon Recoveries

Mr. Green also reported that gill net catches and tag returns have dropped sharply during November, indicating the end of this year's run of returning fish. Total gill net catch stands at 157 silver salmon, including 19 tagged fish. Twenty-eight of the total were females. Approximately 80% tag shedding or tag mortality is indicated by the tagged-to-untagged ratio in the gill net compared with those ratios when the fish were released. Using the revised numbers of tagged fish indicates a return of 3.5 to 4.5% to date in the first year's returns of the fall, 1975 and spring, 1976 releases.

Tag recovery data were analysed during this month. The larger fish, at tagging, predominate returns from the spring, 1976 release; however, no size-related differences appeared in returns from the fall, 1975 release. Also some rather curious results appeared. Superficially, it appears that a higher fraction of fish which were recorded as having some type of defect at tagging are being recovered than is true for fish where no problem was recorded. Fall-released, tagged fish stopped showing up on October 16, and since that date 10 spring-released, tagged fish have been recovered.

Fishing Power Studies

An angling methods-efficiency experiment was designed and conducted jointly with the Rockfish Task to furnish data for fishing power studies. Three terminal gear types were tested, using six anglers on six sections of the laboratory deck. A rotation system was used to achieve equal time with all combinations of gear, angler, and position. Mr. Larry Green of Field and Stream Magazine furnished six experienced salt water anglers for the experiment. Approximately 60 rockfish were caught. Data will be analysed next month.

Anglers' Guide to the United States Pacific Coast

Ms. S. Smith reported that early in the month, color proofs of the 40 coastline fishing charts for the Anglers' Guide were sent to the Tiburon Laboratory for checking. Many of the proofs had to be re-ordered because of a technical error made by the contractor.

In an attempt to speed up work on other elements of the book, Ms. Smith offered to prepare camera-ready art for 20 of the angler facility tables--the remainder to be done by NMFS' Scientific Publications Staff in Seattle. These were completed at the end of the month and sent to SPS in Seattle.

The Anglers' Guide is a special NMFS publication which describes marine game fishes, fishing grounds, and angler facilities along the coasts of California, Oregon, Washington, Alaska, Hawaii, American Samoa, and Guam.

COASTAL FISH COMMUNITIES INVESTIGATIONS

Biological Cycles Monitored at Catalina Island

During this month, Dr. Edmund Hobson, Leader of the Kelp Forest Communities Task, and Fishery Biologist Tony Chess at the Tiburon Laboratory, revisited their study area at Santa Catalina Island. During their recent long-term investigation at this location, they had monitored the biotic changes in a habitat that transformed from a submarine field of low algae, to a kelp forest. After 3 years as a kelp forest, the site has returned to its former state--a field of low algae. It was the intent of Hobson and Chess during this trip to measure the changes that have occurred during this transition among the resident fishes and related organisms. The assessment was made using the methods standardized during earlier study here: visual counts, airlift, spear, etc. In addition, observations (but no collections) were made at a second site where a dense mat of coralline algae overgrowing large rocks had been progressively grazed away by sea urchins (Strongylocentrotus franciscanus) during the last year of the project there. The coralline algae is now gone, the rocks barren, and among the rocks are the tests of thousands of urchins that apparently perished when their food supply was exhausted.

Contract Awarded to Design Pilot Survey of Rockfish Landings

A contract was awarded to Mr. Patrick K. Tomlinson to design a pilot survey of rockfish landings in central and northern California. Dr. William Lenarz, Leader of the Rockfish Analysis Task, reports that this survey intends to produce data needed for estimating optimal allocation of future sampling effort among ports, fishing gear, and time for routine sampling of rockfish landings. The study is underway, and a final report is due by December 31.

International Groundfish Sub-Committee Meets

Mr. Peter Adams, Fishery Biologist with the Rockfish Analysis Task, attended a meeting of the technical sub-committee of the International Groundfish Committee at Renton, Washington. Under discussion were the 1976 rockfish surveys at Monterey and Queen Charlotte Sound, as well as preliminary plans for next year's survey.

Preliminary Study Suggests that Certain Rockfishes Aggregate when at Specific Depths

Based on analyses of trawl catches, Mr. Peter Adams has determined that certain rockfish species have highly aggregated distributions when within zones of specific water depths, but that they are distributed randomly when above or below these zones.

MEETINGS AND TRAVEL (If not otherwise noted in text)

October 23 -

November 11 - Mr. Shomura attended the Symposium on the Development and Utilization of Inland Fishery Resources (October 27-29), participated in the Fourth Joint Session of the Indian Ocean Fishery Commission/Indo-Pacific Fisheries Council (IPFC) Special Committee on Tuna Management (October 29-30), participated in the 17th Session of the IPFC (November 1-5), and visited several fishery facilities in the Philippines, including the Southeast Asian Fisheries Development Center (SEAFDEC) Iloilo Aquaculture Facility.

November 4

- A Workshop on Coastal Fisheries/CalCOFI Data Management System was held at La Jolla, chaired by Center Planning Officer David Mackett, Ms. Dorothy Roll, and others from the automatic data processing group here. Mr. Parrish attended from the PEG group. As one result of the meeting, it was agreed on that by December 1977, the start of the new CalCOFI year, there should be a data management system in place from that time on for CalCOFI data. All data taken on previous CalCOFI cruises would be brought up to speed as expeditiously as possible. Agreement was also reached that the development of a data base management system would not interfere with on-going work and requirements for biomass estimates.

8-10 - Radio Tagging and Satellite Tracking Workshop at the Center.

10 - Sus Kato of the Tiburon Laboratory (TL), traveled to Moss Landing, California, to arrange processing facilities for packing euphausiid shrimp.

- 10-13 - Dr. John Hunter traveled to Washington, D.C. to attend a workshop at the Environmental Protection Agency on Biological Instrumentation for UV Studies.
- 12 - Dr. Paul Smith traveled to Long Beach, CA to provide technical assistance in the presentation of the Anchovy Management Plan to the California Fish and Game Department.
 - Mr. Shomura attended public hearings on the Preliminary Management Plan Draft Environmental Impact Statement on Precious Coral and Seamount Resources held at the State Capitol.
 - Mr. Shomura attended a meeting of the Hawaii Animal Species Advisory Commission, called by Dr. John W. Beardsley, Chairman; there was a discussion of the Laboratory's northern anchovy baitfish transport program.
- 12-13 - Maxwell Eldridge, TL, attended a 2-day conference on aquaculture sponsored by the Monterey Bay Research Institute, Santa Cruz, California.
- 15 - Mr. Mackett in Monterey to discuss administrative and personnel matters with PEG Acting Director and staff.
- 15-16 - Mr. Mackett in Seattle to attend coast-wide data systems meeting.
- 15-17 - Dr. Michael Laurs, Acting Deputy Director, in Seattle to attend Pacific Marine Fisheries Commission meeting on albacore.
- 15-18 - Sus Kato and Bill Lenarz of TL traveled to Indian Wells, California, to attend the annual CalCOFI conference.
- 15-19 - Dr. Fox in Washington to participate in hearings for 1977 porpoise regulations.
 - Dr. Parrish, PEG, attended the annual CalCOFI meeting at Indian Wells and presented a paper, coauthored with Craig Nelson, PEG, which related the survival of pelagic eggs and larvae to surface transport patterns in the California Current area. Following the CalCOFI meeting he participated in a CalCOFI-INP stock assessment workshop on anchovy.

- November 19 - Acting Center Director Barrett and Dr. G. Stauffer traveled to Terminal Island to attend the public hearing on the jack mackerel preliminary management plan.
- 22 - Director Norman Abramson of the Tiburon Laboratory, attended the Pacific Regional Fishery Management Council in San Francisco.
- 22-26 - Mr. Gunter Seckel attended WMO sponsored Technical Conference on the applications of Marine Meteorology to the High Seas and Coastal Zone Development (TECMAR) held in Geneva, Switzerland.
- 23 - Mr. Charles Yamamoto, member of MAFAC, met with Mr. Shomura.
- Mr. Shomura attended a half-day meeting of the Sea Grant Panel at the Governor's conference room (State Capitol).
- 24 - Messrs. Shomura, Otsu, and Ito met with Dr. Tommy Nakayama's Tuna Group to review progress on the project dealing with histamine/honeycombing in skipjack tuna. Dr. Nakayama is with the Department of Food Science and Technology, University of Hawaii.
- 26 - Mr. Shomura called a meeting of scientific personnel and the officers of the Townsend Cromwell to keep the latter informed of our programs, including a general review of the NWHI program.
- November 29-
December 3 - Dr. Laurs in Miami, Florida to attend the annual meeting of the Western Fish Boat Owner's Association.
- 30 - Dr. Parrish attended a meeting in Monterey concerning a NMFS contract to evaluate the economics of an offshore fishery for anchovy and jack mackerel.

PUBLIC RELATIONS

Dr. Eric Barham, Special Assistant for Marine Mammals at the La Jolla Laboratory, delivered lectures on the porpoise/tuna problem before the following school groups this month:

- November 8-10 - Santee School, 80 high school students.
- 15 - Patrick Henry High School, 135 high school students.
- 22 - Spoke to two oceanography classes, consisting of about 20 students in each class at Grossmont College.

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Fishery Biologist David Kramer of the La Jolla Laboratory discussed fisheries research in the California Current and the Porpoise/Tuna Program at Glen Ridge High School in Escondido on November 8.

The participation of both Dr. Barham and Mr. Kramer was arranged through the "Meet the Scientist Lecture Program" sponsored by the Greater San Diego Industry-Education Council of the San Diego County Department of Education.

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The salmon-rearing activities of the Tiburon Laboratory were filmed and aired on Channel 5 (San Francisco) Television News last month, and were also featured several times on "Fisherman's Forecast" by KCBS radio, also of San Francisco.

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A class from Chabot College, Livermore, California, visited the Tiburon Laboratory to observe the salmon-rearing program, November 19. Elementary school classes have been visiting the project on a twice-weekly basis during all of November and will continue into next month.

TRAINING

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|---------------------------|--|
| October 21-
November 4 | - Mr. Howard Yoshida of the Honolulu Laboratory, completed a course "Beginning JCL" at the University of Hawaii Computing Center. |
| November 1-3 | - Dr. A. Dizon of the Honolulu Laboratory completed a course on minicomputers. |
| 1-5 | - Dr. Robert Skillman and Dr. Roy Mendelssohn of the Honolulu Laboratory completed a U.S. Civil Service course, "Introduction to supervision." |

HONORS AND AWARDS

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| October 28 | - Alice Jellett, Special Achievement Award - Tiburon Lab |
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Acting Director, SWFC to Serve on Scientific and
Statistical Committee of the Pacific Regional
Fishery Management Council

The Pacific Regional Fishery Management Council has named Izadore Barrett, Acting Director, SWFC, to serve on their Scientific and Statistical Committee. This Committee will advise the Council on technical matters and recommend individuals to participate on working teams to develop fishery management plans.

A meeting of the Pacific Regional Fishery Management Council, Scientific Committee and advisory groups is scheduled in San Diego, California, January 11 & 12.

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Dr. Gary Sakagawa, Leader of the Tuna Resources Program at the La Jolla Laboratory, was elected District Director of the American Institute of Fishery Research Biologists for a period of 3 years and assumed his duties at the recent meeting of the group in San Juan Capistrano.

VISITORS

Honolulu Laboratory

- November 5 - Dr. John Belshe of the Corps of Engineers, Honolulu, visited Acting Laboratory Director Richard Barkley.
- 9 - Dr. Richard Williams, Program Leader, Biological Oceanography, National Science Foundation, Washington, D.C.
- 24 - Mr. Harry Kami, Chief, Division of Fish and Wildlife Government of Guam, met briefly with Mr. Shomura. They discussed matters pertaining to the Western Pacific Regional Fishery Management Council.

La Jolla Laboratory

- November 3 - Mr. Hans Meyer, West Berlin Radio.
- 4 - Mr. Douglas E. Ford, NOAA, Rockville, Maryland.
Ms. Janis Hyne, Northeast Fisheries Center, Woods Hole, Massachusetts.
- 4-5 - Mr. Doug Ford, Telecommunications Management and Planning Division, NOAA, Washington, D.C.

- November 9 - Dr. Richard Williams, Program Leader, Biological Oceanography, National Science Foundation, Washington, D.C.
- 11 - Mr. Leo Fisher, Office of Program Planning, Budget and Evaluation, NMFS, Washington, D.C.
- 30 - Don and Inez Klopfenstein, Freelance journalists, Pinehurst, Idaho.

Pacific Environmental Group

- November 15 - I. Barrett, Acting Director, SWFC

Tiburon Laboratory

- November 1 - H. Seigiyama, Taiyo Fishery Co., Japan
- 10 - John C. Belahe, Corps of Engineers, Fort Belvoir, Virginia
- 15 - Frank Crossfield, California Division of Forestry, Santa Rosa, California.
- 16 - Jim Slawson, SW Regional Office, Terminal Island, California
- 17 - Robert E. Flatow and Dewitt Y. Mooney, Reflo Purification Company.
- Christine Petersen Harris, Scripps Institution of Oceanography, La Jolla, California
- 22 - John Inase, San Francisco State University.
- Eric Perlase, Perlase Films.
- 24 - Lee Benson, University of California, Berkeley, California

PERSONNEL

Appointments

- October 28 - Michael J. Bowers, Biological Technician - Appointment - Tiburon Laboratory
- November 1 - Barbara Caluori, Clerk-typist - Part-time appointment - Tiburon Laboratory

- November 8 - Dana Eng, Biological Aid - Appointment - Tiburon Laboratory
- Carolyn Frieber, Clerk-typist - 30-Day appointment,
 Tiburon Laboratory
- Dennis J. King, Biological Aid - Intermittent - Tiburon
 Laboratory
- 9 - Rebbecca Morrow, Clerk-typist - Temporary appointment -
 La Jolla Laboratory
- 12 - James Sands, Biological Technician - Termination,
 La Jolla Laboratory
- Sue Allen, Clerk-typist - Temporary appointment -
 La Jolla Laboratory
- 19 - Stephen Stangl, Biological Technician - Termination -
 La Jolla Laboratory
- 21 - Alice Jellett, Secretary (Steno) - Promotion - Tiburon
 Laboratory
- 22 - Michael A. Barry, Biological Technician - Temporary
 appointment, part-time - Honolulu Laboratory
- 29 - Robert Haught, Lt.JG, .NOAA Corps - reported for duty -
 Tiburon Laboratory
- 30 - Robert S. Hoffman, Biological Aid of the Tiburon Labora-
 tory resigned to accept an appointment with the South-
 west Regional Office in Terminal Island.

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